# Cyclone Idai, Mozambique, March 2019

A Baseline against the Copernicus EMS flood map of the event: the event's flood mapped from radar (M3), and the flood-prone zones, which never saw it.

> **Draft, not yet independently reviewed (2026-11-15).** Numbers come from `case_study_idai.json` (`manage.py case_study_event idai`, code 3ca21d6). The comparison rules were fixed before any score was computed; they are in the command's description.

## What was compared

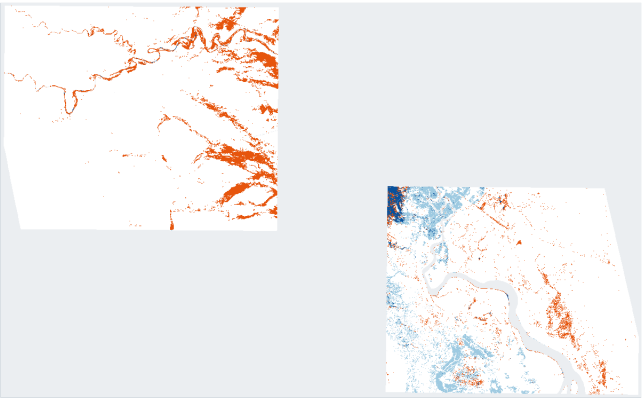
- **Reference:** Copernicus EMS rapid mapping EMSR348 (Cyclone Idai, Mozambique), flooded area of Mafambisse and Lamego, from COSMO-SkyMed, 17 March 2019 03:28 UTC (from each map's image notes). It is another satellite than Sentinel-1, so the reference is independent of M3's data. © European Union. Copernicus Emergency Management Service.
- **Baseline:** 3,288 km² around the EMS areas, event date 2019-03-15, radar up to 7 days after (M3 used 2019-03-19, 2019-03-20). Run 7ebe5fbc.
- **Scored** on the Baseline's 30 m grid inside the EMS areas (1,444 km² compared), without rivers and lakes, water before the event, or cells the radar didn't see. CSI = hits / (hits + misses + false alarms): 1 is a perfect match. Bias = Baseline area / EMS area − 1: 0 is the same size, below 0 smaller, above 0 larger.

## Results

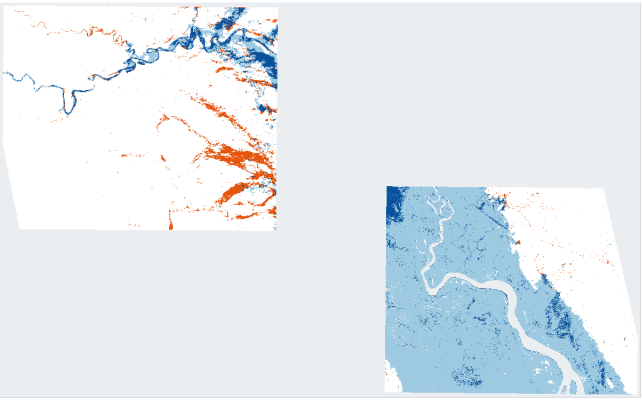
| | CSI | Hit rate | Precision | Bias | Baseline, km² | EMS, km² |
|---|---|---|---|---|---|---|
| M3 event flood | 0.057 | 0.09 | 0.14 | -0.38 | 52.6 | 84.2 |
| Zones A + B | 0.092 | 0.56 | 0.10 | 4.65 | 476 | 84.2 |
| Zones A + B + C | 0.114 | 0.87 | 0.12 | 6.46 | 628 | 84.2 |

Of the EMS flood, 56.2 % lies in the flood-prone zones A + B (7.1 % in zone A) and 86.7 % in zones A, B or C.

| Each EMS area | CSI, M3 | CSI, zones A + B | EMS flood, km² |
|---|---|---|---|
| Mafambisse | 0.095 | 0.060 | 27.4 |
| Lamego | 0.007 | 0.257 | 56.8 |



M3 against the EMS flood.



Zones A + B against the EMS flood.

Both · EMS flood only (missed) · Baseline only · Not compared

## Limits

- The EMS image and M3's radar are days apart; water can rise or drain in between.
- Radar (of either kind) misses water under trees and between buildings, and flood water among crops can look bright, not dark.
- An EMS map is a rapid product made in hours; it is a reference, not the truth.
- The zones are not a forecast of one event: they show where floods are likely, so a single event fills only part of them, and a large one can reach beyond.